BTeV WBS Dictionary

Subproject WBS Level 2 Element Number

WBS 1.1
Vertex and Torroidal Magnets and Beam Pipe

This document provides WBS Dictionary information
for a BTeV WBS Level 2 project and all its subprojects.

BTeV WBS Dictionary
Basis of Cost Estimate

WBS Element Number:

1.1.1

WBS Element Name:

Magnet Acquisition

WBS Element Definition:

The acquisition of the analysis magnet from Fermilab Experiment E866 for use in the proposed BTeV experiment

Ground Rules & Assumptions:

The welded iron and aluminum coil magnet (Fermilab designation ME7AN2, commonly known as SM3) was first assembled in the Meson Detector Building at Fermilab in 1981 for experiment E605. It will be disassembled and transported to C0 for use in BTeV. SM6 coils will be repaired for use in this magnet.

Estimate Source:

Design work by A. Touhktarov and test magnet disassembly by M. Mascione

Basis of Estimate:

Four outside pieces of the iron core of the magnet were removed in 1999 in order to evaluate the techniques and costs of disassembly. The fixtures needed have been drawn based on the original plans and drawings of the assembly in 1981.

BTeV WBS Dictionary
Basis of Cost Estimate

WBS Element Number:

1.1.2

WBS Element Name:

Magnet Modification and Assembly

WBS Element Definition:

In order to be used in the BTeV experiment, the iron core of the magnet must be modified and the modified magnet must be reassembled in the C0 assembly hall.

Ground Rules & Assumptions:

The reassembly, basically the inverse of the disassembly, will be based on the initial assembly experience in 1981 and a disassembly test in 1999. The modifications will follow standard engineering and magnet fabrication procedures at Fermilab.

Estimate Source:

C. Brown and M. Mascione

Basis of Estimate:

Detailed disassembly scenario prepared by A. Touhktarov

BTeV WBS Dictionary
Basis of Cost Estimate

WBS Element Number:

1.1.2.2.3

WBS Element Name:

Magnet Measurement

WBS Element Definition:

In order to be used in the BTeV experiment, the magnetic field of the magnet must be measured to a precision of approximately .1%.

Ground Rules & Assumptions:

Standard techniques for measuring large analysis magnets using the Ziptrack Hall Probe measuring device will be employed.

Estimate Source:

C. Brown and D Christian

Basis of Estimate:

The modifications to the Ziptrack for use in this magnet, and the electronics needed for the measurement, are all standard items at Fermilab whose costs are well understood.

BTeV WBS Dictionary
Basis of Cost Estimate

WBS Element Number:

1.1.3

WBS Element Name:

Magnet Transportation, Installation and Testing at C0

WBS Element Definition:

The magnet must be supplied with electrical power and cooling water and moved from the C0 assembly hall into the C0 detector hall.

Ground Rules & Assumptions:

The magnet will be supplied with power and LCW water in a similar manner to all other high current electromagnets in the Fermilab accelerator complex. It will be rolled into the hall using well-established rigging techniques.

Estimate Source:

C. Brown, M. Mascione and L Beverly

Basis of Estimate:

Standard Fermilab power and cooling components and installation techniques are costed.

BTeV WBS Dictionary
Basis of Cost Estimate

WBS Element Number:

1.1.4

WBS Element Name:

Beam Pipes

WBS Element Definition:

Special small diameter and thin walled beam pipes must be fabricated in the region of the detector components in order to maximize the experimental acceptance and minimize the scattering of secondary particles in the beam pipe walls. A special transition piece is needed to connect the beam pipe to the silicon detector vacuum box.

Ground Rules & Assumptions:

The beam pipes and transition pieces will be fabricated from aluminum.

Estimate Source:

C. Brown, A. Touhktarov and L Nelson

Basis of Estimate:

Preliminary design developed by A. Touhktarov and C. Brown

BTeV WBS Dictionary
Basis of Cost Estimate

WBS Element Number:

1.1.5

WBS Element Name:

Muon Toroids

WBS Element Definition:

Four magnetized Iron toroids with associated excitation coils, power, and LCW cooling are included in the detector.

Ground Rules & Assumptions:

The iron will be purchased and the coils will be fabricated by the Fermilab Technical Division. Additional soft iron will be purchased to fabricate 2 magnetic field shield plates and the absorber blocks next to the beam pipe.

Estimate Source:

C. Brown, A. Makarov, M. Mascione L. Nelson, and L Beverly

Basis of Estimate:

1) Iron estimated by G. Kobliska and L Nelson
2) Coils estimated by the Technical Division, see spreadsheet from Makarov/Gardner dated 3/17/00
3) Assembly and rolling of the toroids into the detector hall estimated using standard rigging techniques

BTeV WBS Dictionary
Basis of Cost Estimate

WBS Element Number:

1.1.6

WBS Element Name:

ES&H

WBS Element Definition:

All items in Section 1.1 involve mechanical and electrical fabrications and installations that are similar to many previous experimental projects at Fermilab. They will require only the usual laboratory standard ES&H reviews.

Ground Rules & Assumptions:

All fabrications, modifications and installations will be reviewed by ES&H staff in collaboration with the BTeV staff.

Estimate Source:

C. Brown

Basis of Estimate:

C Brown estimate

BTeV WBS Dictionary
Basis of Cost Estimate

WBS Element Number:

1.1.7

WBS Element Name:

Vertex Management and Beam Pipe Project Management

WBS Element Definition:

This element consists of the costs associated with all management activities related to the vertex and toroidal magnets and the beam pipe.

Ground Rules & Assumptions:

This element includes coordination of the work carried out at various institutes, site-visit, vendor visit, book-keeping, accounting, and reporting to internal and external reviews of the project. Review at regular intervals is necessary to keep track of the progress of the project. Travel to various sites are needed to coordinate the smooth running of the project and the timely delivery of components needed from the vendors. A project engineer will monitor the progress and coordinate with the project management in 1.20 as required.

Cost Estimate Source:

The cost is basically an estimate of the number of travels that is deemed to be necessary. It also includes the time that it will take the engineers and technicians to prepare and attend the reviews. Labor is costed at Fermilab rates. All trips are based on experience and costed based on place and length of travel.

Basis of Cost Estimate:

Estimate is based on experiences with projects of similar complexity.